REMARKS

Claims 1 and 21 are amended to change "a gelling agent" to the more precise term --gelatin--, which amendment is supported by the specification as originally filed at least at page 4, lines 23-24, and by examples 1 and 4. Review and reconsideration of the application in view of Applicants' amendments and remarks are respectfully requested. Applicants submit all of claims 1-25 are in condition for allowance for at least the following reasons.

35 U.S.C. §102(b) over Sutton et al.

Claims 1, 8-12, and 16-19 are rejected under 35 U.S.C. §102(b) over Sutton et al. (US Patent 5,714,340). For at least the following reasons, Applicants traverse the rejection.

According to the Office Action, Sutton et al. discloses a method of detecting biological samples including providing a microarray having a substrate with no preselected sites for microsphere association, and coated with a composition comprising microspheres dispersed in a fluid containing a gelling agent, wherein the microspheres are immobilized at random positions on the substrate, and at least some microspheres contain an optical barcode and a biological probe. Applicants submit Sutton et al. does not teach, disclose, or suggest the claimed invention as set forth in claim 1 and the claims dependent therefrom.

Sutton et al. is directed to an immunoassay for detecting the presence of a single ligand, as described at col. 12, lines 59-63. The immunoassay comprises a substrate, a cross-linked hydrophilic polymer layer on the substrate, a bead spreading layer on the cross-linked layer, and a labeled ligand layer on the bead spreading layer, as well as a receptor layer wherein the receptors are bonded to particles at the interface between the cross-linked layer and the bead spreading layer. *See* col. 2, lines 23-33, col. 5, lines 27-31, and figure 7. Sutton et al. teaches at col. 2, lines 43-46, col. 3, lines 3-89, and col. 6, lines 54-56, that the polymer used to form the receptor layer is critical, and must be selected from a polymer of one of the enumerated groups I-VI. The failure of other polymers to work is described at col. 7, lines 28-32, and in Example 1, at col. 14, lines 29-45. In particular, at lines 31-32 of col. 4, it is stated that "[g]elatin destroyed the antibody binding capacity completely." Sutton et al.

further requires that the dye used to detect the labeled ligand attachment to the receptor be detectable upon an enzymatic reaction, or by combination of reagents that form the dye, as described at col. 11, lines 1-17, and at col. 2, lines 47-62.

Sutton et al. does not teach, disclose, or suggest a microarray as claimed by Applicants. In particular, as demonstrated above, Sutton et al. does not teach, disclose, or suggest at least the following features of Applicants' invention:

> 1) a population of micro-spheres dispersed in a fluid containing gelatin;
>
> 2) a population of micro-spheres immobilized in a single layer at random positions with a uniform density on a substrate; and
>
> 3) at least one sub-population of a population of micro-spheres containing an optical barcode generated from at least one colorant associated with the micro-spheres and including a biological probe.

With regard to Applicants' use of gelatin in the layer containing the microspheres, Sutton et al. actively teaches against the use of gelatin at col. 14, lines 31-32, stating that gelatin "destroyed the antibody binding capacity completely."

With regard to immobilization of the microspheres, at random positions with a uniform density on a substrate, neither the beads of the bead spreading layer nor the receptors of the cross-linked hydrophilic polymer layer can be compared to the micro-spheres of Applicants claimed composition. The beads of the bead spreading layer of Sutton et al., as shown in Figure 1 of Sutton et al., form a stack comprising multiple layers of beads. In contrast, the claimed invention has a single layer of microspheres on a substrate, as claimed and as shown in Figs. 2A, 3A, and 4A. The receptors of Sutton et al., shown in Figures 3-5 and discussed at col. 10, lines 3-11, form clusters in a cross-linked hydrophilic polymer layer. The Patent Office asserts a random distribution of the receptors is evidenced in Sutton et al. at col. 14, lines 49-51. This is a selected portion of the text of Example 2 of Sutton et al. Read in its entirety, lines 49-51 show that Example 2 describes "the superior uniform coating achieved in the receptor zone with the Group I polymers" (emphasis added). The Group I polymers are the polymers used to coat the receptors on the cross-linked hydrophilic polymer layer, but may be absent from the receptor zone in the finished product, as taught at col.

7, lines 22-27. The distribution of the receptors within the polymer is not disclosed or suggested. In contrast, the claimed invention is directed to microspheres that are randomly dispersed with a uniform density on a substrate, as explained and exemplified in Example 4 at page 15, line 15, - page 17, line 4, of Applicants' specification. As defined in Applicants' specification at page 4, lines 28-30, a random distribution is one in compliance with a Poisson distribution. The Office Action asserts Applicants' Fig. 4 and Example 4 show clumps of microspheres in Fig. 4 at squares 30, 60, 65, and 86. While these squares do show more than one microsphere, and some show two touching microspheres, the overall distribution conforms to a Poisson distribution. The figures of Sutton et al. shows many clusters of receptor beads, each having more than two beads touching, but does not disclose or suggest that the distribution of the receptor beads would meet a Poisson distribution. The distribution of receptors shown in the figures of Sutton et al. appear to more closely resemble Applicants' comparative example, Fig. 5A, which is not a Poisson distribution. Applicants' note that the material used to form the comparative example resulting in Fig. 5A corresponds to the Group II polymer for the receptor layer of Sutton et al., poly(vinyl alcohol). Applicants demonstrate in Examples 1 and 4 that poly(vinyl alcohol) does not achieve the objectives of the claimed invention, and results in a non-random distribution of microbeads as shown in Fig. 5A, which pattern, though nearly random, does not conform to a Poisson distribution.

Sutton et al. teaches an indicator composition in the bead spreading layer or receptor zone, as taught at col. 10, lines 58-67. The indicator composition is separate from, and not part of, either the beads of the bead spreading layer or the beads of the receptor zone. In contrast, Applicants claim use of a microsphere with an associated colorant and a biological probe.

As described herein, Sutton et al. does not teach all the elements of the claimed invention. For example, Sutton et al. does not teach at least a microarray comprising microspheres in a single layer randomly dispersed with a uniform density in gelatin on a substrate wherein at least one sub-population of the population of microspheres contains an optical barcode generated from at least one colorant associated with the microspheres and a biological probe. For at least the above

reasons, reconsideration and withdrawal of the rejection are in order and are respectfully requested.

35 U.S.C. §103(a) over Sutton et al.

Claims 2-4 and 13-15 are rejected under 35 U.S.C. §103(a) over Sutton et al. (US Patent 5,714,340) in view of Walt et al. (US Patent 6,327,410). Claims 5-7 and 2-22 are rejected under 35 U.S.C. §103(a) over Sutton et al. in view of Porter et al. (US Patent 6,146,899). Claim 20 is rejected under 35 U.S.C. §103(a) over Sutton et al. in view of Chang et al. (US Patent 4,873,35). Claims 23-25 are rejected under 35 U.S.C. §103(a) over Sutton et al. in view of Porter et al. as applied to Claim 21 above, and further in view of Walt et al. For at least the following reasons, Applicants traverse each of the above rejections.

As discussed above, Sutton et al. does not disclose or suggest the subject matter of the claimed invention as set forth in independent claim 1 and the claims dependent therefrom. Independent claim 21 includes all the features of claim 1, and is distinguished from Sutton et al. for at least the same reasons. In particular, Sutton et al. does not disclose or suggest at least a microarray including a population of micro-spheres dispersed in a fluid containing gelatin and immobilized in a single layer at random positions with a uniform density on a substrate, wherein at least one sub-population of said population of micro-spheres contains an optical barcode generated from at least one colorant associated with the micro-spheres and a biological probe.

Walt et al. requires a substrate having discrete, individual sites for attachment of microspheres, and therefore teaches away from the claimed invention.

Porter et al. is directed to patterned immobilization of a target on a patterned surface for use as a height referencing biochemical cassette. Porter et al. requires the three-dimensional patterning in order to be effective in determining bonding of target molecules. See, for example, page 2, lines 28-31; page 3, lines 4-6; and page 5, lines 18-50. Porter et al. does not disclose or suggest random immobilization on a substrate, and teaches away from such random immobilization.

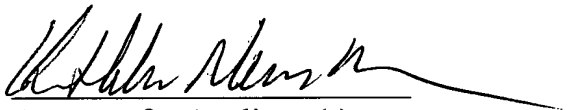
Chang et al. is directed to the formation of magnetic particles. Chang et al. does not disclose or suggest a microarray, a method of making the same, or a method of identifying biological samples using a microarray.

None of the secondary references of Walt et al., Porter et al., Chang et al., or any combination thereof, overcome the deficiencies of Sutton et al. In particular, none of the references, taken alone or in any combination, disclose or suggest a microarray including a population of micro-spheres dispersed in a fluid containing gelatin and immobilized in a single layer at random positions with a uniform density on a substrate, and wherein at least one sub-population of said population of micro-spheres containing an optical barcode generated from at least one colorant associated with the micro-spheres and a biological probe, as claimed by Applicants. For at least the above reasons, reconsideration and withdrawal of each rejection under 35 U.S.C. §103(a) are in order and are respectfully requested.

For at least the reasons set forth above, Applicants submit all of Claims 1-25 are in condition for allowance. Prompt and favorable action are respectfully requested.

Should the Examiner require anything further, or have any questions, the Examiner is asked to contact Applicants' undersigned representative.

Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.